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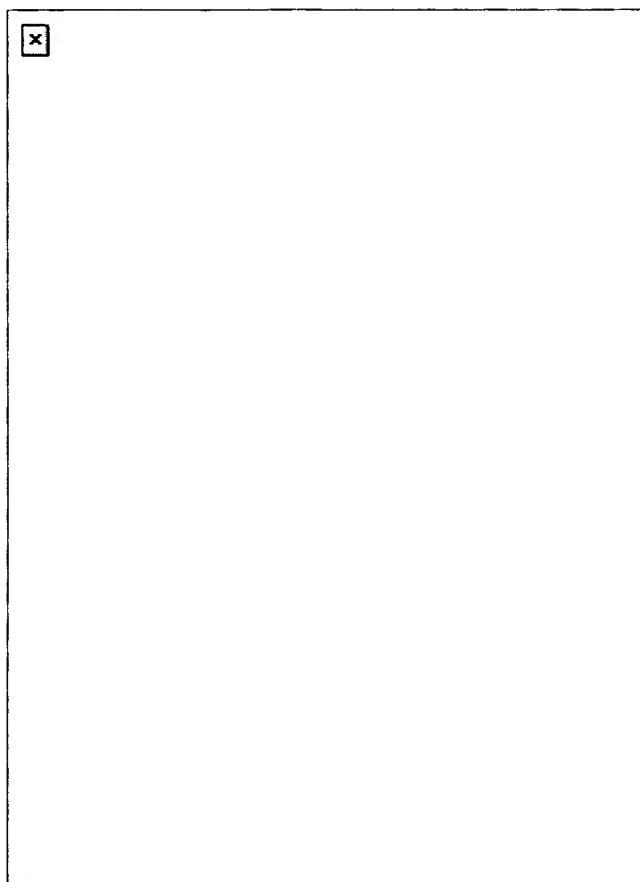
ELECTROPHOTOGRAPHIC DEVICE

Patent number: JP62215278
Publication date: 1987-09-21
Inventor: MATSUO KURATSUBO
Applicant: KYOCERA CORP
Classification:
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- european:
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Priority number(s):

Abstract of JP62215278

PURPOSE:To eliminate the possibility that a service-man and a user for replacing a unit contacts an electrically conducted part by mistake, by concealing an electrically conducting means into a device body of a partition wall, at the time of a state that a process unit has been detached from the device body side.

CONSTITUTION:At the time of detaching a developing unit 2, an oscillating member 6 is turned by following a rotation of a supporting shaft 36, the developing unit 2 is pushed up in the diagonal upper direction along a guide groove 35, and the developing unit 2 is separated from a photosensitive drum 14. A pressure welding lever 40 follows it and turns by a prescribed angle, a rod-shaped advance and retreat member 56 is pressed, and a connector pin 52 and a unit side connector part 51 are separated. A turning plate 55 is fixed by both the pressure lever and the rod-shaped advance and retreat member 56. In this way, it is not feared at all that the turning plate 55 turns to a unit installing space B side by mistake, and the pin connector 52 is exposed to the outside.



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(54) Title of the Invention: Electronic photograph apparatus

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(72) Inventor: Kuratsubo Matsuo

in Tokyo Central Laboratory of Kyocera Corporation
14, Tamagawadai 2-chome, Setagaya-ku, Tokyo

(71) Applicant: Kyocera Corporation

5-22, Higashino Kitainoue-cho, Yamashina-ku, Kyoto-shi, Kyoto

(74) Agent: Patent Attorney, Masahisa Takahashi

Specification

1. Title of the Invention

Electronic photograph apparatus

2. Claims

1) An electronic photograph apparatus in which one or a plurality of process unit(s) for providing at least a part of electronic photograph process means is/are provided so as to be detachable from an apparatus body, comprising:

a partition wall formed to face a space in which the unit is attached;

conduction means provided at the partition wall at an apparatus body side so as to oscillate; and

a window section having an opening at a position corresponding to that of the conduction means of the partition wall,

wherein the electronic photograph apparatus is characterized in that, in conjunction with an operation involved with attachment of the process unit, the conduction means is oscillated via the opening window section toward the space in which the unit is attached so as to be connectable to a connector section at a unit side.

2) The electronic photograph apparatus according to claim 1, characterized in a structure in which at least a plurality of prevention means are provided for preventing oscillation of the conduction means, the prevention means are sequentially linked with a plurality of operations involved with the attachment of the process unit to cancel the oscillation of the conduction means.

3) The electronic photograph apparatus according to claim 1 or 2, characterized in a structure in which, the conduction means is provided, in conjunction with an operation for holding the unit for positioning the process unit at a predetermined position, to oscillate toward the space in which the unit is attached.

3. Detailed Description of the Invention

[Industrial Applicability]

The present invention relates to a copier, a printer, a facsimile, and other electronic photograph apparatuses for performing an image forming by an electronic photograph process. More particularly, the present invention relates to an electronic photograph apparatus in which one or a plurality of process unit(s) s

constituting at least a part of the electronic photograph process means is/are detachably provided to the apparatus body.

[Prior Art]

Conventionally, in an electronic photograph apparatus (e.g., copier or printer), in order to provide the maintenance and the exchange of the components by a customer in an easier manner and in order to provide the development of a color image, electronic photograph process means (e.g., photoconductor drum, optical system, developing machine, transcription machine, cleaning member, neutralization machine, charge machine, and fixing apparatus) are designed to be partially or entirely unitized so that the unit can be detachably attached to the apparatus body.

The process unit has therein electrical components for providing the electronic photograph process means (e.g., emission lamp); various types of circuit substrates (e.g., discharge circuit, development bias circuit); a service life detection mechanism for the various types of process means; and/or various types of electric control devices (e.g., toner remaining amount detection mechanism). Thus, these electrical components and/or control devices require a means for providing a power source thereto.

Such a power source supply means includes, for example, the one provided by allowing a unit to include a dry cell or the like so that each unit has an independent closed circuit. However, such a structure has problems such as a large weight or an increased space in spite of the demand for reducing the space. Thus, a power source supply is generally provided to allow an apparatus body facing a process unit to have a connector pin and other electric connection members so that, when the unit is attached to the apparatus body, the connector section provided in the vicinity of the unit automatically has a contact with the connector pin, thereby allowing an external power source supplied in the apparatus to be supplied to the unit side.

[Problem to be Solved by the Invention]

However, such a structure causes an electrical continuity section provided at the apparatus body side (e.g., connector pin) to be always exposed to a space in which the unit is provided and which is opened to the exterior. This causes the electrical continuity section to be mistakenly contacted with a user while the unit is being

exchanged, which is not desirable from a safety viewpoint.

With this background, known electronic photograph apparatuses have been provided with a safety mechanism by which the power source is turned OFF when the apparatus's front cover or the like is opened before the unit is detached or the unit is to be detached. However, such a structure for allowing every unit exchange to be linked with the shutoff of the power source causes a fixing roller or the like mounted at the apparatus body side to have a reduced temperature whenever the unit is exchanged, thus causing a problem in which the apparatus may not provide a copying or printing operation until the fixing roller reaches a predetermined temperature.

In the field of a copier and a printer in particular, various apparatuses providing a color development have been suggested. However, this type of apparatus requires a development unit or a process unit including a development means to be frequently exchanged whenever another color is used, thus causing the above problem to be more serious.

In view of such problems in the prior art, the present invention has an objective of providing an electronic photograph apparatus that can perfectly prevent a risk of causing a service man or a user responsible for the exchange of the unit to mistakenly have a contact with the conductive part.

It is another objective of the present invention to provide an electronic photograph apparatus that can provide a copying or printing operation immediately after the unit exchange.

[Means for Solving the Problems]

In order to solve such technical problems, the present invention suggests a technical means requiring, as the essential conditions thereof, an electronic photograph apparatus in which one or a plurality of process unit(s) for providing at least a part of an electronic photograph process means is/are provided so as to be detachable from the apparatus body, comprising:

- (1) a partition wall formed to face a space in which the unit is attached;
- (2) a conduction means such as a connector pin and others provided at the partition wall at the apparatus body side so as to oscillate; and
- (3) a window section having an opening at the position corresponding to that

of the conduction means of the partition wall,

(4) wherein the electronic photograph apparatus is structured such that, in conjunction with one or a plurality of operations involved with the attachment of the process unit, the conduction means is oscillated via the opening window section toward the space in which the unit is attached so as to be connectable to a connector section at the unit side.

Although embodiments as later described will describe an example in which the present invention is applied as a conduction control means of a development unit, the present invention is not limited to this and can be applied to all process units provided by integrating one or a plurality of process means into a unit.

[Operation]

According to such a technical means, when a unit is detached from the apparatus body, a conduction means for supplying a power source to the unit (e.g., connector pin) is hidden in the apparatus body of a partition wall and thus is not positioned in a space in which the unit is provided and which is opened to the exterior. This can perfectly prevent a risk of causing a service man or a user responsible for the unit exchange to mistakenly have a contact with the conductive part.

This eliminates the need as in the prior art for providing a safety mechanism through which the power is turned OFF when the unit is detached. This allows a copying or printing operation to be performed immediately after the unit exchange.

Also, according to a favorable embodiment of the present invention, at least a plurality of prevention means are provided for preventing the oscillation of the conduction means. The prevention means are structured so as to be sequentially linked with a plurality of operations involved with the attachment of the process unit so that the prevention means cancels the prevention of the oscillation of the conduction means, thereby providing the use of a so-called double safety mechanism.

This perfectly prevents the risk of causing the conduction means to be mistakenly oscillated toward the space in which the unit is attached to be exposed, thus providing a further improved safety.

Furthermore, the conduction means is structured to, in conjunction with a unit holding operation for positioning and holding the process unit at a predetermined

position, be oscillated toward the space in which the unit is attached. This allows, without causing the conduction means to be mistakenly oscillated toward the space in which the unit is attached in the middle of the attachment operation, a consumer or the like to attach the unit without the risk of putting his or her hand into the space in which the unit is attached. When the attachment operation is completed, the conduction means being hidden is allowed to be oscillated toward the attachment space, thereby providing a further improved safety.

[Embodiment]

Hereinafter, a favorable embodiment of the present invention will be exemplarily described in detail with reference to the drawings. It is noted that size, material, shape, and the relative arrangement of the constituting components described in this embodiment are, unless otherwise specifically described, a mere exemplary explanation and do not intend to limit the range of this invention to only them.

Figure 1 to Figure 5 illustrate a laser printer in which the present invention is applied to a conduction control mechanism of a development unit.

As shown in Figure 2, the present apparatus is structured such that recording paper fed from a paper feeding cassette attached to a cassette inlet 9 is sent on a recording paper conveyance path formed in the apparatus while transcribing and fixing an image corresponding to the image in f o r m i n g, after which an outlet 10 opened to the upper face of the apparatus is allowed to discharge the paper on a tray or in a sorter (not shown).

The present apparatus has, at the center of the front external wall, an openable and closable door 11. When the door 11 is opened, then a drum unit 1 that can be drawn and attached in the direction of a drum shaft 14a and a lever member 5 for fixing and releasing the drum unit 1 are exposed. In the drawing, the front external wall has, at the right part, a console panel 12 consisting of operation buttons and a display section.

The apparatus has, at the upper face, an openable and closable cover body 13. When the cover body 13 is opened, then toner can be put into a development unit 2 and the development unit 2 can be detached and attached.

Next, the positional relation between various process means and the

conduction control mechanism in the apparatus will be described based on Figure 1A.

As shown in Figure 1A, the drum unit 1 is composed of a photoconductor drum 14, a cleaning apparatus 15, a charge machine 16, and a frame 17 for integrally fixing or pivotally supporting them. The frame 17 has, at the upper right and upper left corners, rail guides 18 and 19. The rail guides 18 and 19 are used as a guide to allow the unit 1 along rails 7 and 8 provided between chassis 3 and 4 to be drawn and pushed in the direction of a drum shaft 14a, thereby allowing the unit 1 to be detached and to be attached to a predetermined position.

The frame 17 has the center portion of the upper face that has a stepped shape and the stepped portion is provided as an opening 20, thereby allowing light from the neutralization lamp 21 to be introduced on the surface of the photoconductor drum 14.

As shown in Figure 2, the frame 17 has, at the front end side, a substantially rectangular cover member 22 (a section shown by the thick imaginary line of Figure 1A) that is provided in a fixed manner. The front cover member 22 has at the front face a handle section 23 for drawing the drum unit 1 in the forward direction and an elongated groove opening 24 provided at the side wall. When the lever member 5 has a turning operation, then the development unit 2 and the drum unit 1 can have a separating operation while allowing the lever member 5's tip end section to be engaged with the elongated groove opening 24, thereby allowing the drum unit 1 to be fixed (locked).

On the other hand, the photoconductor drum 14 has at the upper part a light scanning unit 26 that is fixed at a predetermined position by a supporting wall 25 fixedly provided between the front and rear chassis 3 and 4 at the apparatus body side. The photoconductor drum 14 also has at the lower part a transcription machine 27. The transcription machine 27 has at the inlet side a recording paper delivery guide 28 and a resist roller 29 that are provided at predetermined positions of the apparatus body, respectively.

The light scanning unit 26 and the delivery guide 28 have therebetween the photoconductor drum 14 the side of which has a space in the apparatus (in other words, the supporting wall 25 and the partition wall 50 provided between the chassis 3 and 4), thereby allowing a space B in which the unit is attached at the lower part of the cover

body 13 to have the development unit 2.

The development unit 2 consists of: a development roller 30 for delivering thickness-controlled toner to a development position at the photoconductor drum 14; a development container 31; and a control circuit storage section 311 provided to be linked with the right end side of the top view of the development container 31.

The development container 31 has at the front and rear wall faces a guide groove 35. The guide groove 35 has, at the corresponding position, guide pins 32 and 33 in a projecting manner. The development container 31 has at the right end side the storage section 311 in which there are provided a connector section 51 provided along the partition wall 50; a circuit substrate (not shown) for providing a development bias and other various types of controls that is connected to the connector section 51; or the like. The wall face at the partition wall 50 corresponding to the connector section 51 is provided as an opening 311a. The connector pin 52 as described later is inserted via the opening section 311a into the storage section 311 so as to have a contact with the connector section 51.

On the other hand, the partition wall 50 facing the development container 31 allows a portion 53 corresponding to the opening section 311a and a portion 54 corresponding to a development container inclination section 31a provided at the lower part to be opened, respectively. As shown in Figure 4A and Figure 4B, a pressure contact lever 40 positioned at both sides of the front and rear walls of the development container 31 has at the corresponding position a through hole. The through hole 54 is inserted with a stick-like forward/backward member 56 that moves in forward and backward directions in accordance with the turning of a turning plate 55 as described later.

The opposite side of the space B in which the unit is attached of the partition wall 50 (hereinafter referred to as apparatus body side) has a supporting plate 57 orthogonal to the partition wall 50 in a fixed manner. The supporting plate 57 has at the lower side an opening window section. The opening window section has at the corresponding position a push lever 58 at the rear side of which a turning plate 55 is provided. The push lever 58 and the turning plate 55 are pivotally supported, respectively.

The push lever 58 is configured to have a substantially elbow shape centered at the supporting point around which the push lever 58 is turned. The push lever 58 is applied by the engagement spring 59 with an elastic force in the clockwise direction. The lower free end is elongated in an obliquely downward direction and the upper free end is elongated in a substantially perpendicular direction, which are provided so as to have a contact with the inclination face 31a of the development container 31 and the upper face of the turning plate 55, respectively.

The turning plate 55 has a flat plate shape and the lower opening window section 54 has at the rear side the turning supporting point 55a. The turning plate 55 is elongated from the turning supporting point 55a to a position corresponding to that of the upper opening window section 53. The upper end section has at the side of the partition wall 50 the connector pin 52. The engagement spring 60 provides an elastic force in the counter-clockwise direction so that the turning plate 55 always has a contact with the upper end of the push lever 58. The turning plate 55 is also elongated to reach the front wall of the development container 31 so that the turning plate 55 faces, as shown in Figure 4A, the rear end of the stick-like forward/backward member 56 that is inserted to the partition wall 50 so as to move in the forward/backward direction.

Next, such a development unit will be described with regards to the attachment/detachment mechanism mainly based on Figure 3 to Figure 5.

The chassis 3 and 4 facing the development unit 2 has, at the inner wall side, the guide plate 34 in a fixed manner in which the guide groove 35 having a concave shape is provided that can be engaged with the guide pins 32 and 33. The guide groove 35 is used as a guide for allowing the development unit 2 to be structured so as to be attached and detached.

At the opposing side of the position facing the photoconductor drum 14, there is the development unit 2 that has at the lower space position the supporting shaft 36. The supporting shaft 36 is rotatably and pivotally provided between the chassis 3 and 4 in parallel with the drum shaft 14a. One tip end section of the supporting shaft 36 is extruded to reach the exterior of the front chassis 3 and 4.

The supporting shaft 36 is, at the neighborhood of the center, linked with the

rear end of a pair of oscillation members 6. The chassis 3 and 4 corresponding to the guide pins 32 and 33 have, at the neighborhood of the inner wall face, a pair of pressure contact levers 40 that are provided so as to turn and to have a circle shape. Furthermore, one tip end section of the supporting shaft 36 that is extruded to the exterior of the front chassis 3 is linked with the rear end of the link member 42 the other end of which is engaged via the pin shaft 43 with an arc-shaped elongated hole 41 at the lever member 5 side, respectively.

The pair of oscillation members 6's tip ends are elongated to the lower part of the development unit 2 at the side of the photoconductor drum 14. When the oscillation member 6 is turned in accordance with the rotation of the supporting shaft 36, the development unit 2 is pushed up along the guide groove 35 in an obliquely upward direction (in other words, in the direction along which the development roller 30 is separated from the photoconductor drum 14).

The pair of pressure contact levers 40 are elongated along the wall face of the development container 31 in an obliquely upward direction. The center position is engaged via the pin 44 with one end of the click clack spring 45. The other end of the click clack spring 45 is engaged with the pin 46 that is extruded from the wall face of the development container 31.

As shown in Figure 5, the link member 42 has, at the tip end side, the pin shaft 43 that can be engaged with the arc-shaped elongated hole 41 of the lever member 5. The link member 42 is turned by a predetermined angle in accordance with the turning operation of the lever member 5 so that the turning can be transmitted to the supporting shaft 36.

The lever member 5's tip end is elongated toward the elongated groove opening 24. The lever member 5 also has at the front face a projected grip section 48. The turning operation of the grip section 48 is used to allow the lever member 5 to be turned around the rotation shaft 5a. The rotation shaft 5a has, at the periphery thereof and from an obliquely upward position to the drum unit, the arc-shaped elongated hole 41 that is extruded so as to have an increased radius and to have a curvature of 90°. As described above, the arc-shaped elongated hole 41 is linked via the pin shaft 43 with the link member 42.

Next, the operation of such an embodiment will be described based on the procedure for attaching and detaching the development unit 2.

First, when the development unit 2 or the drum unit 1 is detached, then the front door 11 is opened to subsequently hold the grip section 48 so that the lever member 5 is turned in the clockwise direction to a position shown by the imaginary line. Then, the engagement between the drum unit 1 and the lever member 5 is canceled to allow the link member 42 to be turned by a predetermined angle, thereby allowing the turning to be transmitted to the supporting shaft 36.

Then, in accordance with the rotation of the supporting shaft 36, the oscillation member 6 is turned and the development unit 2 is pushed up in an obliquely upward direction along the guide groove 35 and is separated from the photoconductor drum 14.

Furthermore, when the oscillation member 6 pushes up the development unit 2 along the guide groove 35 and in an obliquely upward direction, then the pressure contact lever 40 having a pressure contact with the guide pin 32 is allowed to be rotated by a predetermined angle. The click clack spring 45 one end of which is engaged with the pressure contact lever 40 is also bent by a predetermined angle. This switches the direction along which the spring 45 applies an elastic force and allows the pressure contact lever 40 to be separated from the guide pin 32 so that the pressure contact lever 40 is turned and engaged to an upper and perpendicular position.

When the pressure contact lever 40 is turned in the clockwise direction, then the stick-like forward/backward member 56 is pushed to move rearward as shown in Figure 4A. Then, the turning plate 55 having a pressure contact with the stick-like forward/backward member 56 is turned against the elastic force in the counter-clockwise direction, thereby allowing the connector pin 52 to be separated from the connector section 51 at the unit side.

Thus, this status shuts off a power source supply from the connector pin 52 to the unit, separates the photoconductor drum 14 from the development roller 30, and cancels the pressure contact force of the pressure contact lever 40. This makes it possible to release the chassis 13 to detach, without damaging the photoconductor drum 14 or the like, the development unit 2 along the guide groove 35 in a safe and

simple manner.

When the development unit 2 is detached, then the push lever 58 locked by the inclination face 31a of the development container 31 is turned in the clockwise direction by the elastic force of the engagement spring 59 to push the turning plate 55.

Then, the turning plate 55 is thus fixed by both of the push lever 58 and the stick-like forward/backward member 56. This perfectly prevents a risk of causing the turning plate 55 to be mistakenly turned to the space B in which the unit is attached to cause the pin connector 52 to be exposed to the exterior.

When the development unit 2 is attached again along the guide groove 35, then the development container 31's inclination face 31a firstly pushes the push lever 58 such that the push lever 58 is turned in the counter-clockwise direction against the elastic force by the engagement spring 59 and is separated from the turning plate 55.

After the development unit 2 is attached, the lever member 5 is turned down toward the drum unit 1. This allows the drum unit 1's elongated groove opening 24 to be engaged with the lever member 5 to lock the drum unit 1 to allow the supporting shaft 36 to be turned in the counter-clockwise direction via the link member 42. In accordance with the turning of the supporting shaft 36, the oscillation member 6 is turned in the downward direction, the development unit 2 is slid along the guide groove 35, and the development roller 30 is positioned to a predetermined position facing the photoconductor drum 14.

When the development unit 2 is slid in the downward direction, then the click clack spring 45 is bent to have a displacement to a predetermined angle, a direction along which the spring 45 applies an elastic force is changed, and the pressure contact lever 40 is turned toward the guide pin 32. This allows the development unit 2 to have a pressure contact via the guide pin 32 to use the elastic force by the spring 45 to position and hold the development unit 2.

Furthermore, when the pressure contact lever 40 is turned in the counter-clockwise direction, then the turning plate 55 locked via the stick-like forward/backward member 56 is canceled. This allows the elastic force by the engagement spring 60 to turn the turning plate 55 in the counter-clockwise direction. As a result, the connector pin 52 is inserted via the opening window section 53 into the

storage section 311 to provide an electric contact with the unit-side connector section 51, thereby providing a power source supply from the connector pin 52 to the unit.

[Effects of the Invention]

As described above, according to the present invention, the process unit being detached from the apparatus body allows the conduction means to be hidden in the partition wall's apparatus body. This can perfectly prevent a risk of causing a service man or a user responsible for the exchange of the unit to mistakenly have a contact with the conductive section.

This eliminates the need as in the prior art to provide a safety mechanism for turning OFF the power source at the detachment of the unit. This allows a copying or printing operation to be performed immediately after the unit exchange.

Also, according to the present invention, a design can be provided in which a so-called double safety mechanism is used and, when the apparatus according to the present invention is attached without causing a risk of causing a consumer or the like to put a hand into the space in which the unit is attached, the conduction means being hidden is oscillated toward the attachment space. This provides various remarkable effects (e.g., further improved safety).

4. Brief Description of the Drawings

Figure 1 to Figure 5 illustrate a laser printer in which the development unit's conduction control mechanism uses the present invention.

Figure 1A is a front cross sectional view illustrating the positional relation between various process means and the conduction control mechanism when the development unit is attached. Figure 1B is a front cross sectional view of a main part illustrating the positional relation of the conduction control mechanism when the development unit is detached. Figure 2 is a perspective view of the appearance illustrating the apparatus when the tray and the paper feeding cassette or the like are detached. Figure 3 is a top view mainly illustrating the positional relation of the development unit's attachment/detachment mechanism. Figure 4A and Figure 4B are a front view of the main part illustrating the positional relation of the safety mechanism seen from the front face of the development unit and a perspective view of the appearance. Figure 5 is a front view of the main part illustrating a means for

separating the development unit from the drum unit.

Patent Applicant: Kyocera Corporation

Agent: Patent Attorney, Masahisa Takahashi

FIG. 1A

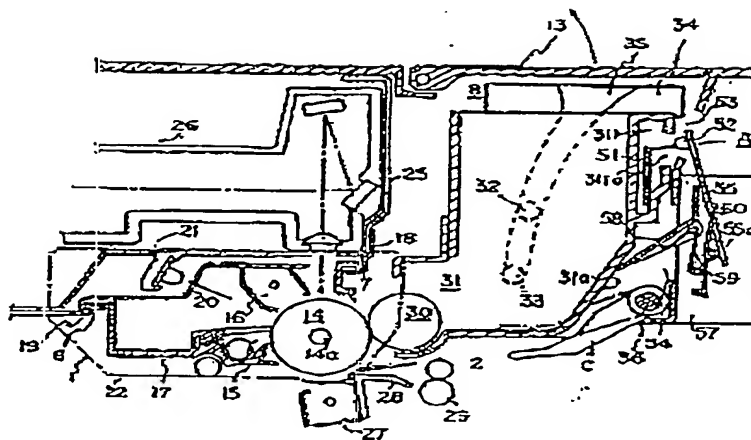


FIG. 1B

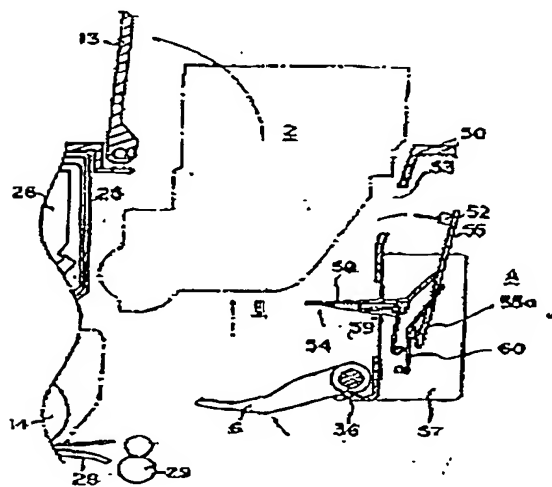


FIG.2

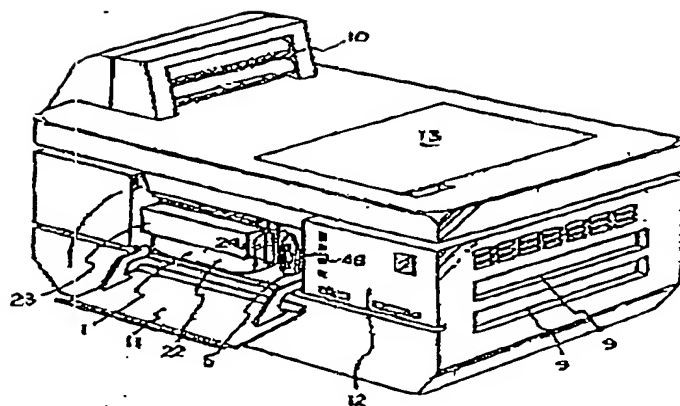


FIG.3

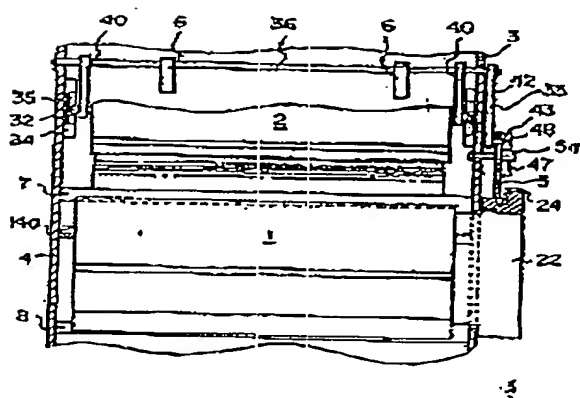


FIG.4A

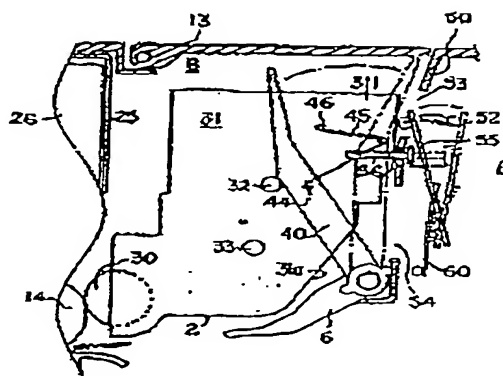


FIG. 4B

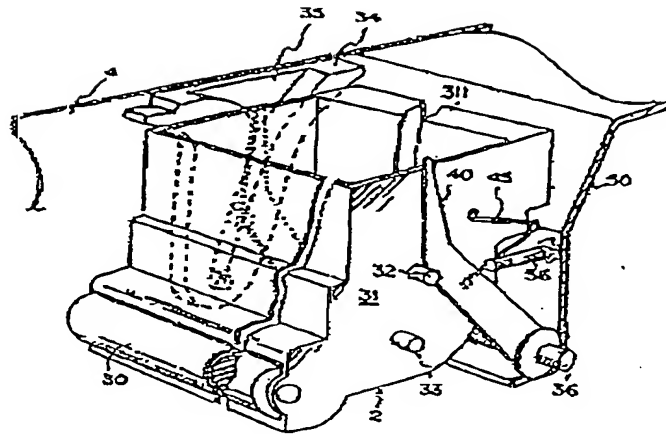
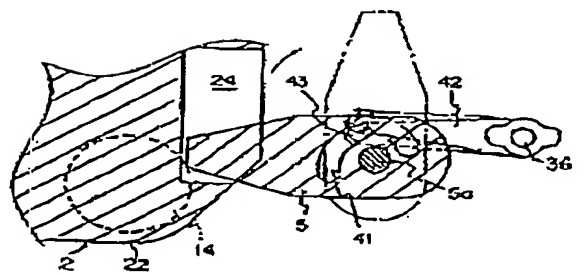


FIG. 5



⑨ 日本国特許庁 (J P)

⑩ 特許出願公開

⑪ 公開特許公報 (A) 昭62-215278

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⑭ 発明の名称 電子写真装置

⑮ 特 願 昭61-57824

⑯ 出 願 昭61(1986)3月15日

⑰ 発 明 者 松 尾 倉 坪 東京都世田谷区玉川台2丁目14 京セラ株式会社東京中央研究所内

⑱ 出 願 人 京セラ株式会社 京都市山科区東野北井ノ上町5番地の22

⑲ 代 理 人 弁理士 高橋 昌久

要 約

1. 発明の名称

電子写真装置

2. 特許請求の範囲

1) 電子写真プロセス手段の少なくとも一部を構成する一又は複数個のプロセスユニットが装置本体に対し着脱自在に構成された電子写真装置において、ユニット装着空間と対面させて形成した仕切壁と、該仕切壁の装置本体側に磁気的に配設された通電手段と、該仕切壁の通電手段と対応する位置に開口した窓部とを有し、プロセスユニットの装置に付なう動作に連動して、前記通電手段が前記開口窓部よりユニット装着空間側に揺動し、ユニット側のコネクタ部に接触可能に構成した事の特許とする電子写真装置

2) 前記通電手段の揺動を阻止する少なくとも複数の阻止手段を設け、該阻止手段が前記プロセスユニットの装置に付なう複数の動作に連動して通電手段の揺動阻止を解除するように構成した事の特許とする特許請求の範囲第1項記載の電子写真装

説 明

1) 前記プロセスユニットを所定位置に位置決めする、ユニット保持動作に連動して、前記通電手段がユニット装着空間側に揺動するように構成した事の特許とする特許請求の範囲第1項又は第2項記載の電子写真装置

3. 発明の詳細な説明

「産業上の利用分野」

本発明は、複写機、プリンタ、ファクシミリその他の電子写真プロセスにより画像形成を行う電子写真装置に係り、更に詳細には、電子写真プロセス手段の少なくとも一部を構成する一又は複数個のプロセスユニットが装置本体に対し着脱自在に構成された電子写真装置に関する。

「従来の技術」

従来より複写機やプリンタ等の電子写真装置においてはメインテナンスと故障レベルでの部品交換の容易化を図る為に、更にはカラー現象を可能ならしめる為に、感光体ドラム、充電系、現像剤、転写剤、クリーニング部材、除電器、静電器

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及び定着装置等の電子写真プロセス手段の一部又は全部をユニット化し、該ユニットが装置本体に対し着脱可能な構成を採用している。

そして前記プロセスユニット内には前記電子写真プロセス手段を構成する発光ランプ等の電装部品、又は放電回路や電圧バイパス回路等の各種回路基板、更には前記各種プロセス手段の寿命検知機構やトナー残量検知機構等の各種電気的制御機構等が組み込まれている為に、これらの電装部品や制御機構等へ電源供給を行う為の手段を講じる必要がある。

かかる電源供給手段には、例えばユニット内に乾電池等を組み込み、夫々ユニット毎に独立した閉回路を構成するものもあるが、このような構成を取ると重量負担が大、省スペース化の要請に反する、等の問題を有する為に、一般的にはプロセスユニットと対面する装置本体側に、コネクタピンその他の電気的接続部材を配し、前記ユニットを装置本体側に装着させた際に自動的にユニット側に位置するコネクタ部が、前記コネクタピンと

接続し、これにより装置内に供給された外部電源をユニット側に供給可能に構成している。

「発明が解決しようとする問題点」

しかしながらこのような構成を取ると、装置本体側に配設したコネクタピン等の電気的導通部が、外部と開放されたユニット装着空間内に露出する事となる為に、ユニット交換作業中に誤って接触する恐れが生じ、安全上好ましくない。

この為公知の電子写真装置においては、前記ユニット脱着時又はユニット脱着操作の前に行う脱着前カバー等の開放時、電源をOFFにする安全機構を行なっているが、このようにユニット交換の都度電源を遮断する構成を取ると、装置本体側に組み込まれた定着ローラ等がユニット交換の都度温度低下し、該定着ローラが所定温度に達するまで複写又はプリント動作を行ない得ないという問題が生ずる。

特に複写機及びプリンタの分野ではカラー現像を可能に装置が種々提案されているが、この種の

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装置においては、現像ユニット又は現像手段を含むプロセスユニットを色替えの都度頻りに交換しなければならぬ為に、前記問題は一層増幅される。

本発明はかかる従来技術の欠点に鑑み、ユニット交換を行うサービスマンやユーザが、前記導電部分に誤って接触する恐れを完全に防止し得る電子写真装置を提供する事を目的とする。

又本発明の他の目的は、ユニット交換後速やかに複写又はプリント動作を行う事が可能な電子写真装置を提供する事を目的とする。

「問題点を解決しようとする手段」

本発明はかかる技術的課題を達成する為に、電子写真プロセス手段の少なくとも一部を構成する一又は複数個のプロセスユニットが装置本体に対し着脱自在に構成された電子写真装置において、①ユニット装着空間と対面させて形成した仕切壁を有する点、②該仕切壁の装置本体側に揺動可能に配設されたコネクタピンその他の通電手段を有する点、

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③前記仕切壁の通電手段と対応する位置に開口した窓部を有する点

④プロセスユニットの装置に伴う一又は複数の動作に連動して、前記通電手段が前記開口窓部よりユニット装着空間側に揺動し、ユニット側のコネクタ部に接触可能に構成した点を必須構成要件とする技術手段を提案する。

尚、後記実施例においては、本発明を現像ユニットの通電制御手段として適用した例を示しているが、本発明はこれのみに限定されるものではなく、一又は複数のプロセス手段を一体的にユニット化した全てのプロセスユニットに適用可能である。

「作用」

かかる技術手段によれば、ユニットを装置本体側から取外した状態のときは、前記ユニットに電源を供給するコネクタピンその他の通電手段が、仕切壁の装置本体側に隠蔽され、外部と開放状態にあるユニット装着空間内に位置しない為に、ユニット交換を行うサービスマンやユーザが、前記

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通電部分に誤って接触する恐れを完全に防止出来る。

この結果従来技術のように、ユニット脱着時、電源をOFFにする安全機構を付設する必要がなくなり、この結果ユニット交換後速やかに復元又はプリント動作を行う事が可能となる。

又本発明の好ましい実施例によれば、前記通電手段の振動を防止する少なくとも複数の阻止手段を設け、該阻止手段が順次プロセスユニットの装着に伴う複数の動作に連動して通電手段の振動阻止を解除するように構成する事により、いわゆる二重安全機構の採用が可能となる。

この結果前記通電手段が不用意にユニット装着空間側に振動し露出してしまふ恐れを完全に防止出来、安全性が一層向上する。

更に前記プロセスユニットを所定位置に位置決め保持する、ユニット保持動作に連動して、前記通電手段がユニット装着空間側に振動するよう構成する事により、装着動作途中で不用意に通電手段がユニット装着空間側に振動する事なく、ユ

ニット装着空間内に誘導者が手を入れる恐れのない装着動作終了時点で、隠蔽状態にある通電手段が装着空間側に振動する事となり、安全性が一層向上する。

「実施例」

以下、図面を参照して本発明の好適な実施例を例示的に詳しく説明する。ただしこの実施例に記載されている構成要素の寸法、材質、形状、その相対配置などは特に特定の記載がない限りは、この発明の範囲をそのみに限定する趣旨ではなく、単なる説明例に過ぎない。

第1図乃至第5図は、現象ユニットの通電制御機構に本発明を適用したレーザプリンタを示す。

本装置は第2図に示すように、カセット取り付け口8に装着された給紙カセットより給紙された紙が紙が装置内に形成された紙経路導路上を通過しながら画像情報に対応した画像を転写一定角させた後、装置上面側に開口させた排出口10より指示しないトレイ上又はソータ内に排紙されるよう構成されている。

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そして本装置の前部外壁中央には、開閉可能な扉11が取り付けられており、該扉11を開放させる事により、ドラム部14a 方向に引き及び装置可能なドラムユニット1と、ドラムユニット1の固定と固定解除を行うレバー部材5とが露出する。又前部外壁の右上右方には操作部と表示部からなる操作盤12が配設されている。

更に該装置の上面側には開閉可能な蓋体13が取り付けられており、該蓋体13を開放する事により現象ユニット2内へのトナーの投入とともに、現象ユニット2の取り出し及び装荷を行う事が出来る。

次に第16図に基づいて装置内の各種プロセス手段と通電制御機構の位置関係を説明する。

ドラムユニット1は、第18図に示すように感光体ドラム14、クリーニング装置15、帯電露16及びこれらを一体的に駆動又は回転可能に軸支させる枠体17よりなり、該枠体17の上端左右両角部にはレールガイド18,19が形成されており、該レールガイド18,19を案内として機構5,4側に架設さ

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れたレール7,8上を沿ってドラム部14a 方向に引込まれつ押し込む事により、該ユニット1の取り出しと所定位置への装荷を行う事が出来る。

又前記枠体17の上面中央部を脱着状態に形成し、該脱着部を開口20とする事により給電ランプ21の光を感光体ドラム14表面に導くよう構成している。

又前記枠体17の前部側には、第2図に示すように直方形の前カバー部材22（第18図の太線像線で示す部位）が図設されており、該前カバー部材22の正面にドラムユニット1を前方に引き抜く取手部23と、その側面側面に長溝開口24が形成されており、レバー部材5の回転動作により現象ユニット2とドラムユニット1間の離脱動作とともに、レバー部材5の先端部を前記長溝開口24に挿入させてドラムユニット1の固定（ロック）を行う事が出来る。

一方感光体ドラム14上方には、装置本体側の前後両部2,4間に図設された支持部25により所定位置に固定された光走査ユニット28が、感光体

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ドラム14下方位置には転写部27が、更に該転写部27の入口側には記録紙搬送ガイド28とレジストローラ29が夫々装置本体の所定位置に配設されている。

又他記光走査ユニット28と搬送ガイド28間の感光体ドラム14側方の駆動室内空間、言い換えれば隔壁3,4間に配設された支持壁25と仕切壁50により、該壁13下方のユニット装着空間B内には、現像ユニット2が配設されている。

現像ユニット2は同原線画されたトナーを感光体ドラム14側の現像位置まで搬送させる現像ローラ30と現像容器31と、現像容器31上端面上右端側に連設して形成される制御回路収納部311とからなる。

そして前記現像容器31の前後壁面のガイド溝39と対応する位置にガイドピン32,33を突設するとともに、又該現像容器31の右端側に位置する収納部311内に、仕切壁50に沿って立設されたコネクタ部51と該コネクタ部51と接続された現像バイアスその他の各種制御を行う回路基板（図示せず）

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に弾力性を付与されるとともに、下側自由端を斜め下方に又上側自由端をほぼ垂直上方に延設し、夫々現像容器31の傾斜面31aと回転板55上側部と夫々接触可能に形成する。

回転板55は平板状をなし、下側開口窓部54後方に位置する回転支点55aより上側開口窓部53と対応する位置まで上方に延設させ、該上端部の仕切壁50側にコネクタピン52を取り付けるとともに、係合パネ50により反時計方向に弾力性を付与させ、常時押圧レバー59上端との接触状態を維持する。又、該回転板55は側方を現像容器31前後壁面まで延設させ、第44図に示すように前記仕切壁50に延設可能に挿入された棒状連動部材58の後端と対面させる。

次にかかる現像ユニットの脱着機構について、主として第3図乃至第5図に基づいて説明する。

現像ユニット2と対面する隔壁3,4内壁側には、前記ガイドピン32,33に係合可能なガイド溝35が形成されたガイド板34が固着されており、該ガイド

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等を内装し、そして、コネクタ部51と対応する、仕切壁50側の壁部を開口311aとし、後記するコネクタピン32が該開口部311aより収納部311内に侵入しコネクタ部51に接触可能に構成している。

一方該現像容器31と対面する仕切壁50は、前記開口部311aと対応する部位53とその下側の現象容異傾斜部31aと対応する部位54を夫々開口するとともに、第44図及び第45図に示すように現象容器31前後壁面側に位置する圧接レバー48と対応する位置を穿孔し、該貫通孔54に、後記する回転板55の同軸に連動して進退する棒状連動部材58を挿入する。

又仕切壁50のユニット装着空間Bの反対側（以下装置本体側という）には、仕切壁50と直交させて支持板57が固着されており、該支持板57の下側開口窓部と対応する部位に押圧レバー58を、又その後方位置に回転板55を、夫々回転可能に軸支させる。

押圧レバー58は中央の回転支点を中心として略「く」の字状をなし、係合パネ59により時計方向

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に押圧部38を案内として現像ユニット2が装置主体より取り出し可能に構成されている。

又感光体ドラム14対峙位置の反対側の現像ユニット2下方空間位置には、ドラム軸14aと平行に支軸36が隔壁3,4間に回転可能に軸支され、該支軸36の一端先端部を前側隔壁3,4の外方まで突設させている。

そして該支軸36の、中央側に接近した位置には一対の揺動部材8の基端が連結されており、又前記ガイドピン32,33と対応する隔壁3,4内壁面側近傍には一対の圧接レバー48が回転可能に固着されており、更に前側隔壁3の外方まで突設させた支軸36一端先端部には他端がピン軸43を介してレバー部材5側の第2長穴41に係合するリンク部材42基端が夫々連結されている。

前記一対の揺動部材8は、その先端を感光体ドラム14側の現像ユニット2下方位置まで延設し、支軸36の回転に追従して該揺動部材8が回転する事により現像ユニット2がガイド溝35に沿って斜め上方、言い換えれば現像ローラ30が感光体ドラ

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ム14から離脱する方向に押し上げ可能に構成されている。

前記一对の圧接レバー40は現像容器31壁面に沿って斜め上方に延設され、その中央位置でピン44を介してクリッククラックバネ45の一端に係合させる。そして該クリッククラックバネ45の他端を現像容器31壁面より突出したピン48に係合させる。

リンク部材42は、第5図に示すようにその先端側に前記レバー部材5の弧状長穴41に係合可能なピン軸43を取り付け、レバー部材5の回転動作に追従して所定角度回転し、その回転を支軸36に伝達可能に構成する。

レバー部材5は先端部を前記基溝開口24に向け延設するとともに、前面に突設する突起部49の回転操作により回転軸5aを中心として回転可能に構成し、そして該回転軸5aの周面に斜め上方位置よりドラムユニット側、その半径距離が徐々に大になる如く80°面率の弧状長穴41を形成し、前述したように該弧状長穴41にピン軸43を介してリンク

部材42を連結する。

次にかかる実施例の作用を現像ユニット2の若手順に沿って説明する。

先ず現像ユニット2又はドラムユニット1を取り外す際は、前記11を開けた後、図り組48を押ってレバー部材5を時計方向に想像線で示す位置まで回転させると、ドラムユニット1とレバー部材5との係合が解かれるとともに、リンク部材42がこれに追従して所定角度回転し、その回転を支軸36に伝達する。

そして支軸36の回転に追従して該回転部材6が回転し、現像ユニット2がガイド溝35に沿って斜め上方に押し上げられ、現像ユニット2が感光体ドラム14から離脱する。

更に前記駆動部材8の押圧により現像ユニット2がガイド溝35に沿って斜め上方に押し上げられると、ガイドピン32を圧接する圧接レバー40がこれに追従して所定角度回転し、一端が該圧接レバー40に係合しているクリッククラックバネ45が所定角度まで彎曲され、これにより該バネ45の弾

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性力付勢方向が切替わり、前記圧接レバー40がガイドピン32から離脱し、想像上方位置まで回転停止される。

そして前記圧接レバー40の時計方向の回転により第44図に示す如く、柱状進退部材58が押圧されて後退し、該柱状進退部材58に圧接している回転板55が弾性力に抗し反時計方向に回転し、これによりコネクタピン52とユニット側コネクタ部51が離脱する。

従ってこの状態では前記コネクタピン52よりユニット側への電気供給が絶たれている為に、且つ感光体ドラム14と現像ローラ30間が離脱しており、更に圧接レバー40の圧接力が解除されている為に、露光19を開放する事により安全且つ容易に両感光体ドラム14等を調整させることなく、現像ユニット2をガイド溝35に沿って取り出す事が出来る。

そして前記現像ユニット2が脱着されると、現像容器31の傾斜面31aによりロックされていた圧接レバー58が、係合バネ59による弾性力により時

計方向に回転し、前記回転板55を押圧する。

このとき従って前記回転板55は圧接レバー58と柱状進退部材58の両者により固定される事となる為に、誤って前記回転板55がユニット脱着空間B側に回転し、ピンコネクタ52が外部に露出する恐れは全くない。

さて現像ユニット2をガイド溝35に沿って脱着すると、先ず、現像容器31の傾斜面31aが圧接レバー58を押圧する事により、係合バネ59の弾性力に抗して反時計方向に回転し、前記回転板55から離脱する。

そして前記現像ユニット2脱着後、レバー部材5をドラムユニット1側に倒す事により、ドラムユニット1の長溝開口24とレバー部材5とが係合し、該ドラムユニット1がロックされるとともに、リンク部材42を介して支軸36が反時計方向に回転し、該支軸36の回転に追従して駆動部材8が下方に回転し、現像ユニット2がガイド溝35に沿ってスライドし、現像ローラ30が感光体ドラム14との所定対峙位置に位置決めされる。

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そして前記現像ユニット2が下方にスライドすると、クリッククラックバネ45が所定角度まで回転発段し、該バネ45の弾性力付勢力が下方に切換わり、圧接レバー40がガイドピン32側に回転し、ガイドピン32を介して現像ユニット2を圧接し、バネ45の弾性付勢力により現像ユニット2の位置決め保持を行う。

そして更に前記圧接レバー40が反時計方向に回転する事により前記発段退避部材58を介した回転部55のロック状態が解除される為、ばねバネ80の弾性力により回転部55が反時計方向に回転し、これによりコネクタピン52が開口窓部53より収納部311内に収入し、ユニット側コネクタ51との電気的接触が行われ、該コネクタピン52よりユニット側への電源供給が可能となる。

「発明の効果」

以上記載した如く本発明によれば、プロセスユニットを装置本体側から取外した状態のときは、仕切壁の装置本体内に通電手段が隠蔽されている為、ユニット交換を行うサービスマンやユーザ

が、漏記通電部分に誤って接触する恐れを完全に防止出来る。

この結果袋装技術のように、ユニット脱着時、電源をOFFにする安全機構を付設する必要がなくなり、この結果ユニット交換機速やかに複写又はプリント動作を行う事が可能となる。

又本発明によれば、いわゆる二重安全機構の採用やユニット脱着空間内に防護部材が手を入れる恐れのない装置動作終了時点で、隠蔽装置にある通電手段が脱着空間側に移動するよう構成する事が出来る為、安全性が一層向上する。

等の種々の効果を有す。

4. 図面の簡単な説明

第1図乃至第5図は、現像ユニットの通電制御機構に本発明を適用したレーザプリンタを示す。

第1A図は現像ユニットを脱着した状態における各種プロセス手段と通電制御機構の位置関係を示す正面断面図、第1B図は現像ユニットを取外した状態における通電制御機構の位置関係を示す変位正面断面図、第2図はトレイ及び給紙カセッ

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ト等を取外した装置外観斜視図、第3図は主として現像ユニットの通電機構の位置関係を示す平面図、第4A図及び第4B図は現像ユニット前面からみた安全機構の位置関係を示す変位正面図とその外観斜視図、第5図は現像ユニットとドラムユニット間の離間手段を示す変位正面図である。

特許出願人：京セラ株式会社

代理人：弁理士 高橋 昌久

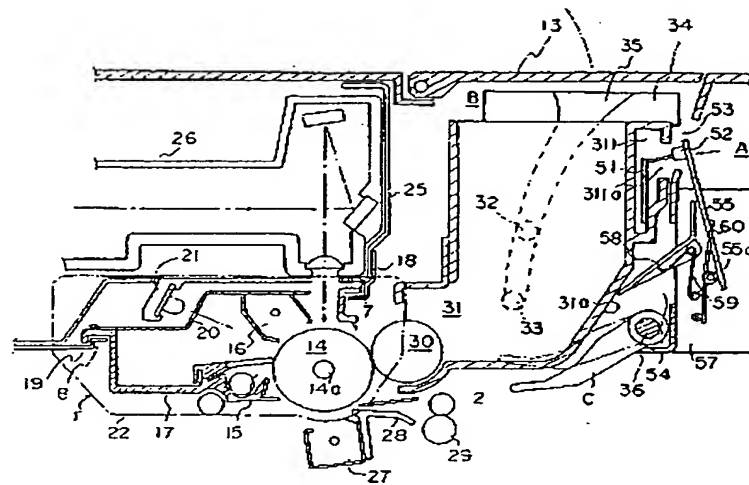


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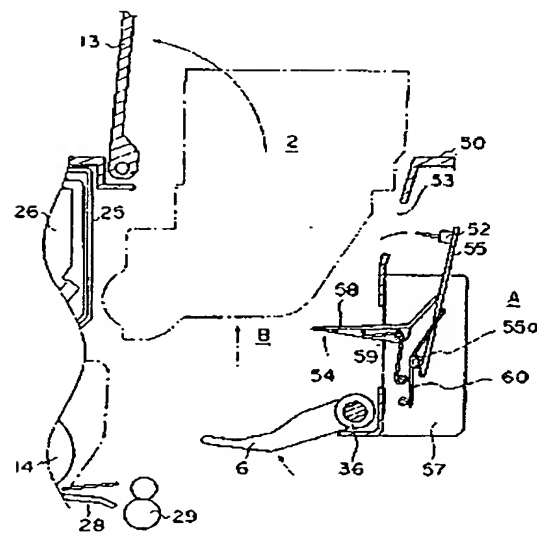
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第1A図

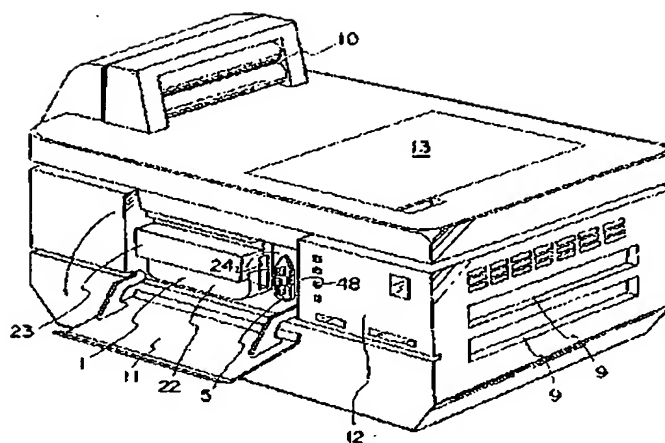


第1B図

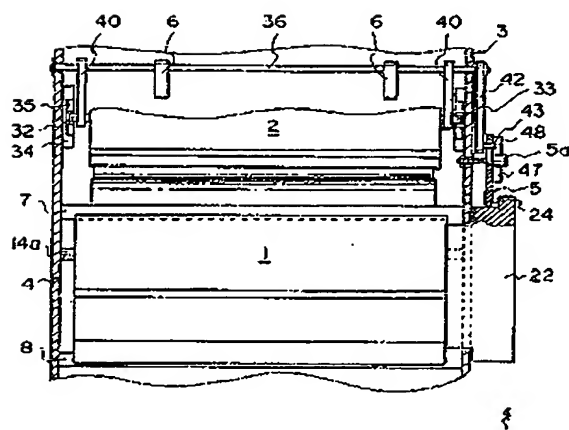


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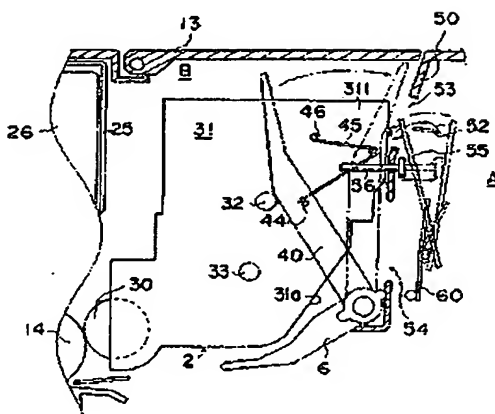
第 2 図



第 3 図

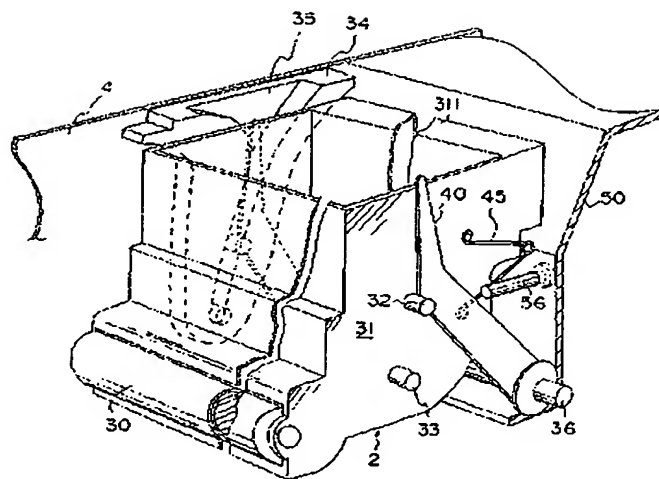


第 4A 図



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第4B図



第5図

